UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,410	07/11/2003	Richard D. Dettinger	ROC920030164US1	5542

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EXAMINER
SAEED, USMAAN

ART UNIT	PAPER NUMBER
2166	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/618,410	DETTINGER ET AL.
	Examiner	Art Unit	
	Usmaan Saeed	2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 July 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/23 & 10/04*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-42 are pending in this office action.

Information Disclosure Statement

2.   Applicants Information Disclosure Statement, filled 07/11/2003 and 10/26/2004,

has been received, entered into record, and considered. See attached form PTO-1449.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 10-12, 15-17, 20-26, 29-31, 34-36, and 39-42 are rejected under 35

U.S.C. 102(e) as being anticipated by **Snodgrass et al. (Snodgrass** hereinafter) (U.S.

PG Pub No. 2004/0117359).

With respect to claim 1, **Snodgrass** teaches **a method for managing query**

execution in a data processing system, comprising:

"**providing at least one query execution schedule configured to schedule**

specific queries against a database in the data processing system" as a set of

candidate algebraic query plans is produced by means of the optimizer's transformation

rules and heuristics. Next, the optimizer considers in more detail each of these plans.

For each algebraic operation in a plan, it assumes that each of the algorithms available

for computing that operation is being used, and it estimates the consequent cost of

computing the query. This way, one best physical query execution plan, where all

operations are specified by algorithms, is found for each original candidate plan

(**Snodgrass** Paragraph 0028). Therefore one of the best plan/schedule is being

chosen for the execution of a query.

"**receiving a query against the database**" as a user application layer for

interaction between the user and said database-based application for entering queries,

a middleware layer overlying a Database Management System (DBMS) and said

middleware layer being intended for processing temporal queries from the user, a

Database Management System (DBMS) layer for processing queries and for accessing

data in a database (**Snodgrass** Paragraph 0015).

"**managing execution of the received query on the basis of the at least one**

query execution schedule" as a set of candidate algebraic query plans is produced by

means of the optimizer's transformation rules and heuristics. Next, the optimizer

considers in more detail each of these plans. For each algebraic operation in a plan, it

assumes that each of the algorithms available for computing that operation is being

used, and it estimates the consequent cost of computing the query. This way, one best

physical query execution plan, where all operations are specified by algorithms, is found

for each original candidate plan (**Snodgrass** Paragraph 0028). Therefore one of the

best plan/schedule is being chosen for the execution of a query.

Claims 20 and 39 are essentially the same as claim 1 except they set forth the

claimed invention as a computer readable medium containing a program and a system

and are rejected for the same reasons as applied hereinabove.

With respect to claim 2, **Snodgrass** teaches **the method of claim 1, wherein**

managing the execution of the received query comprises:

"determining, whether the received query is a specific query" as the stratum maps

temporal SQL statements to regular SQL statements and passes them to the DBMS,

which remains unaltered (**Snodgrass** Paragraph 0005). Specific queries are received

since specific query language like SQL is being used.

"if so, scheduling execution of the received query using the query

execution schedule" as a set of candidate algebraic query plans is produced by

means of the optimizer's transformation rules and heuristics. Next, the optimizer

considers in more detail each of these plans. For each algebraic operation in a plan, it

assumes that each of the algorithms available for computing that operation is being

used, and it estimates the consequent cost of computing the query. This way, one best

physical query execution plan, where all operations are specified by algorithms, is found

for each original candidate plan (**Snodgrass** Paragraph 0028). Therefore one of the

best plan/schedule is being chosen for the execution of a query.

Claim 21 is essentially the same as claim 2 except it sets forth the claimed

invention as a computer readable medium containing a program and is rejected for the

same reasons as applied hereinabove.

With respect to claim 3, **Snodgrass** teaches "**the method of claim 1, wherein**

the at least one query execution schedule defines query eligibility criteria

identifying the specific queries" as means for selecting, according to a criteria, which

query plan to be used when processing a query, said criteria being based on the result

from said cost calculating means (**Snodgrass** Paragraph 0016). "**and a timeframe**

available for executing the specific queries" as means for estimating the cost in

processing resources according to each said query plan by estimating the selectivity of

a temporal selection, said estimate of the selectivity intended for being performed by

using the information that an end time of a period never precedes a start time of the

period (**Snodgrass** Paragraph 0020).

Claim 22 is essentially the same as claim 3 except it sets forth the claimed

invention as a computer readable medium containing a program and is rejected for the

same reasons as applied hereinabove.

With respect to claim 4, **Snodgrass** teaches **the method of claim 3, wherein the query eligibility criteria comprise at least one of:**

"an estimated amount of resources required for execution of the specific queries" as the cost effective query plans can be chosen, avoiding that query plans demanding large resources compared to other plans are chosen. The resources could comprise the IO resources and CPU resources (**Snodgrass** Paragraph 0017).

an availability of data sources accessed by the specific queries

"a user submitting the specific queries

and an application submitting the specific queries" as a user application layer for interaction between the user and said database-based application for entering queries, a middleware layer overlying a Database Management System (DBMS) and said middleware layer being intended for processing temporal queries from the user, a Database Management System (DBMS) layer for processing queries and for accessing data in a database (**Snodgrass** Paragraph 0015). Therefore a user and an application are submitting the queries together.

Claims 10, 16, 23, 29, and 35 are same as claim 4 except claims 23, 29 and 35 set forth the claimed invention as a computer readable medium containing a program and are rejected for the same reasons as applied hereinabove.

With respect to claim 5, **Snodgrass** teaches **"the method of claim 1, wherein the at least one query execution schedule is statically defined by a human operator"** as generating a number of query plans according to queries having been entered by the user by means of said user application layer, each said query plan specifying combinations of operations to be performed and establishing whether the operation should be performed in the middleware layer or the DBMS layer (**Snodgrass** Paragraph 0016). Therefore the operations to be performed are specified by the user in the queries.

Claims 11, 24, and 30 are same as claim 5 except claims 24 and 30 set forth the claimed invention as a computer readable medium containing a program and are rejected for the same reasons as applied hereinabove.

With respect to claim 6, **Snodgrass** teaches **"the method of claim 1, wherein the at least one query execution schedule is dynamically defined by the data processing system on the basis of monitored system parameters"** as FIG. 2 describes the main function of the Execution Engine, which receives an execution-ready plan consisting of a sequence of algorithms with their parameters and arguments (**Snodgrass** Paragraph 0032).

Claims 12, 25, and 31 are same as claim 6 except claims 25 and 31 set forth the

claimed invention as a computer readable medium containing a program and are

rejected for the same reasons as applied hereinabove.

With respect to claim 7, **Snodgrass** teaches **a method for scheduling**

execution of a query against a database in a data processing system, comprising:

"providing a plurality of query execution schedules" as a set of candidate

algebraic query plans is produced by means of the optimizer's transformation rules and

heuristics. Next, the optimizer considers in more detail each of these plans. For each

algebraic operation in a plan, it assumes that each of the algorithms available for

computing that operation is being used, and it estimates the consequent cost of

computing the query. This way, one best physical query execution plan, where all

operations are specified by algorithms, is found for each original candidate plan

(**Snodgrass** Paragraph 0028). Therefore one of the best plan/schedule is being

chosen for the execution of a query. **"each query execution schedule defining query**

eligibility criteria identifying specific queries" as means for selecting, according to a

criteria, which query plan to be used when processing a query, said criteria being based

on the result from said cost calculating means (**Snodgrass** Paragraph 0016). **"and a**

timeframe available for executing the specific queries" as means for estimating the

cost in processing resources according to each said query plan by estimating the

selectivity of a temporal selection, said estimate of the selectivity intended for being

performed by using the information that an end time of a period never precedes a start time of the period (**Snodgrass** Paragraph 0020).

"receiving a query against the database" as a user application layer for interaction between the user and said database-based application for entering queries, a middleware layer overlying a Database Management System (DBMS) and said middleware layer being intended for processing temporal queries from the user, a Database Management System (DBMS) layer for processing queries and for accessing data in a database (Snodgrass Paragraph 0015).

"determining, for the received query, a suitable query execution schedule on the basis of the query eligibility criteria of the plurality of query execution schedules" as means for selecting, according to a criteria, which query plan to be used when processing a query, said criteria being based on the result from said cost calculating means (**Snodgrass** Paragraph 0016).

"scheduling execution of the received query against the database on the basis of the timeframe defined by the suitable query execution schedule" as means for estimating the cost in processing resources according to each said query plan by estimating the selectivity of a temporal selection, said estimate of the selectivity intended for being performed by using the information that an end time of a period never precedes a start time of the period (**Snodgrass** Paragraph 0020).

Claims 26 and 40 are essentially the same as claim 7 except they set forth the

claimed invention as a computer readable medium containing a program and a system

and are rejected for the same reasons as applied hereinabove.

With respect to claim 15, **Snodgrass** teaches **a method of providing a query**

execution schedule for scheduling execution of specific queries against a

database in a data processing system, comprising:

"defining query eligibility criteria identifying the specific queries to be

scheduled by the query execution schedule" as means for selecting, according to a

criteria, which query plan to be used when processing a query, said criteria being based

on the result from said cost calculating means (**Snodgrass** Paragraph 0016).

"defining a timeframe available for executing the specific queries" as

means for estimating the cost in processing resources according to each said query

plan by estimating the selectivity of a temporal selection, said estimate of the selectivity

intended for being performed by using the information that an end time of a period never

precedes a start time of the period (**Snodgrass** Paragraph 0020).

"associating the query eligibility criteria and the timeframe with the query

execution schedule" as means for selecting, according to a criteria, which query plan

to be used when processing a query, said criteria being based on the result from said

cost calculating means (**Snodgrass** Paragraph 0016). Means for estimating the cost in

processing resources according to each said query plan by estimating the selectivity of

a temporal selection, said estimate of the selectivity intended for being performed by

using the information that an end time of a period never precedes a start time of the

period (**Snodgrass** Paragraph 0020). They are both associated with the query

plan/schedule.

Claims 34, 41, and 42 are essentially the same as claim 15 except they set forth

the claimed invention as a computer readable medium containing a program, a system

and a data structure and are rejected for the same reasons as applied hereinabove.

With respect to claim 17, **the method of claim 15, further comprising:**

"monitoring system parameters of the data processing system" as FIG. 2

describes the main function of the Execution Engine, which receives an execution-ready

plan consisting of a sequence of algorithms with their parameters and arguments

(**Snodgrass** Paragraph 0032).

wherein the defining of the query eligibility criteria and the timeframe

comprises:

"dynamically defining the query eligibility criteria" as means for selecting,

according to a criteria, which query plan to be used when processing a query, said

criteria being based on the result from said cost calculating means (**Snodgrass**

Paragraph 0016). **"and the timeframe"** as means for estimating the cost in processing

resources according to each said query plan by estimating the selectivity of a temporal

selection, said estimate of the selectivity intended for being performed by using the

information that an end time of a period never precedes a start time of the period

(**Snodgrass** Paragraph 0020). **"on the basis of the monitored system parameters"**

as FIG. 2 describes the main function of the Execution Engine, which receives an

execution-ready plan consisting of a sequence of algorithms with their parameters and

arguments (**Snodgrass** Paragraph 0032).

Claim 36 is essentially the same as claim 17 except it sets forth the claimed

invention as a computer readable medium containing a program and is rejected for the

same reasons as applied hereinabove.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

.   Claims 8-9, 13-14, 18-19, 27-28, 32-33, and 37-38 are rejected under 35 U.S.C.

103(a) as being unpatentable over **Snodgrass et al**. (U.S. PG Pub No. 2004/0117359)

as applied to claims 1-7, 10-12, 15-17, 20-26, 29-31, 34-36, and 39-42 above, in view

of **Lomet et al**. (**Lomet** hereinafter) (US Patent No. 5,212,788).

With respect to claim 8, **Snodgrass** teaches **the method of claim 7, wherein a**

plurality of suitable query execution schedules is determined and wherein the

scheduling comprises:

"timeframes of the plurality of suitable query execution schedules" as

means for estimating the cost in processing resources according to each said query

plan by estimating the selectivity of a temporal selection, said estimate of the selectivity

intended for being performed by using the information that an end time of a period never

precedes a start time of the period (**Snodgrass** Paragraph 0020).

"scheduling execution of the received query against the database" as a set

of candidate algebraic query plans is produced by means of the optimizer's

transformation rules and heuristics. Next, the optimizer considers in more detail each of

these plans. For each algebraic operation in a plan, it assumes that each of the

algorithms available for computing that operation is being used, and it estimates the

consequent cost of computing the query. This way, one best physical query execution

plan, where all operations are specified by algorithms, is found for each original

candidate plan (**Snodgrass** Paragraph 0028). Therefore one of the best plan/schedule

is being chosen for the execution of a query.

Snodgrass teaches the elements of claim 8 as noted above but does not

explicitly disclose the step of **"determining an intersection."**

However, **Lomet** discloses **"determining an intersection"** as a transaction time

is selected from the intersection of the voted time ranges and is used to timestamp all

updated data that is durably stored when the transaction is committed (**Lomet** Abstract).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the teaching of the cited references because **Lomet's**

teaching would have allowed **Snodgrass** to facilitate determining the overlap in time of

different timeframes, without hurting the system's performance and also providing a

delay lock mechanism (**Lomet** Col 1, Lines 50-58).

Claim 27 is essentially the same as claim 8 except it sets forth the claimed

invention as a computer readable medium containing a program and is rejected for the

same reasons as applied hereinabove.

With respect to claim 9, **Snodgrass** does not explicitly teach **"the method of**

claim 7, wherein a plurality of suitable query execution schedules is determined

and wherein the scheduling comprises:

**determining an intersection of the timeframes of the plurality of suitable
query execution schedules**

determining whether the intersection is empty or not

**if the intersection is not empty, scheduling execution of the received query
against the database on the basis of the determined intersection**

if the intersection is empty, notifying a user."

However, **Lomet** discloses **the method of claim 7, wherein a plurality of
suitable query execution schedules is determined and wherein the scheduling
comprises:**

**"determining an intersection of the timeframes of the plurality of suitable
query execution schedules"** as a transaction time is selected from the intersection of
the voted time ranges and is used to timestamp all updated data that is durably stored
when the transaction is committed (**Lomet** Abstract).

"determining whether the intersection is empty or not

**if the intersection is not empty, scheduling execution of the received query
against the database on the basis of the determined intersection"** as if all the
cohorts to a transaction vote to commit the transaction and the intersection of the voted
time ranges is not empty, then the transaction is committed during the second phase of
the protocol. Also a transaction time is selected from the intersection of the voted time
ranges, and this selected transaction time is used to timestamp all updated data that is
durably stored when the transaction is committed (**Lomet** Col 2 Lines 7-14). In these
lines if the intersection time is not empty then the required operation is being performed.

"if the intersection is empty, notifying a user" if timestamp ranges voted by

the cohorts to a transaction are not sufficiently large, the probability that their

intersection is empty, forcing the transaction to abort, increases (**Lomet** Col 9, Lines 16-

19).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the teaching of the cited references because **Lomet's**

teaching would have allowed **Snodgrass** to facilitate determining the overlap in time of

different timeframes, without hurting the system's performance and also providing a

delay lock mechanism (**Lomet** Col 1, Lines 50-58).

Claim 28 is essentially the same as claim 9 except it sets forth the claimed

invention as a computer readable medium containing a program and is rejected for the

same reasons as applied hereinabove.

With respect to claim 13, **Snodgrass** does not explicitly teach **the method of**

claim 12, wherein the monitored system parameters comprise at least one of:

> **a peak query workload time period**

> **a light query workload time period**

> **a time pattern indicating availability of the database.**

However, Lomet discloses **the method of claim 12, wherein the monitored system**

parameters comprise at least one of:

> **a peak query workload time period**

a light query workload time period

"a time pattern indicating availability of the database" as a multiversion

database is one, which can be queried (i.e., asked or interrogated) as to what the state

of the database was at a specified time. In such multiversion databases, also called

temporal databases, all updated data is "stamped" with a time value, usually with a time

value corresponding to the time at which the data was updated. With the appropriate

support (i.e., software), a query of the timestamped database can provide a transaction

consistent view of the database, as it existed at a specified time (**Lomet** Col 1, Lines

13-24). Therefore a specific time/time pattern indicate the availability/existence of a

database.

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the teaching of the cited references because **Lomet's**

teaching would have allowed **Snodgrass** to enhance the performance of the system by

using the delay lock mechanism (**Lomet** Col 2, Lines 40-46), which keeps the record of

state of database (availability of database) at specified times.

Claims 18, 32, and 37 are same as claim 13 except claims 32 and 37 set forth

the claimed invention as a computer readable medium containing a program ands are

rejected for the same reasons as applied hereinabove.

With respect to claim 14, **Snodgrass** does not explicitly teach **"the method of**

claim 13, wherein the database includes distributed data sources and wherein a

separate time pattern is provided for each distributed data source, the separate time pattern indicating availability of a corresponding distributed data source."

However, **Lomet** discloses **"the method of claim 13, wherein the database includes distributed data sources and wherein a separate time pattern is provided for each distributed data source, the separate time pattern indicating availability of a corresponding distributed data source"** as a multiversion database is one, which can be queried (i.e., asked or interrogated) as to what the state of the database was at a specified time. In such multiversion databases, also called temporal databases, all updated data is "stamped" with a time value, usually with a time value corresponding to the time at which the data was updated. With the appropriate support (i.e., software), a query of the timestamped database can provide a transaction consistent view of the database, as it existed at a specified time (**Lomet** Col 1, Lines 13-24). Therefore a specific time/time pattern indicate the availability/existence of a database.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of the cited references because **Lomet's** teaching would have allowed **Snodgrass** to enhance the performance of the system by using the delay lock mechanism (**Lomet** Col 2, Lines 40-46), which keeps the record of state of database (availability of database) at specified times.

Claims 19, 33, and 38 are same as claim 14 except claims 33 and 38 set forth

the claimed invention as a computer readable medium containing a program ands are

rejected for the same reasons as applied hereinabove.

Conclusion

5.   The prior art made of record and not replied upon is considered pertinent to

applicant's disclosure is listed on 892 form.

Contact Information

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Usmaan Saeed whose telephone number is (571)272-

4046. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Hosain Alam can be reached on (571)272-3978. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Usmaan Saeed
Patent Examiner
Art Unit: 2166

Leslie Wong
Primary Examiner

US
January 05, 2006